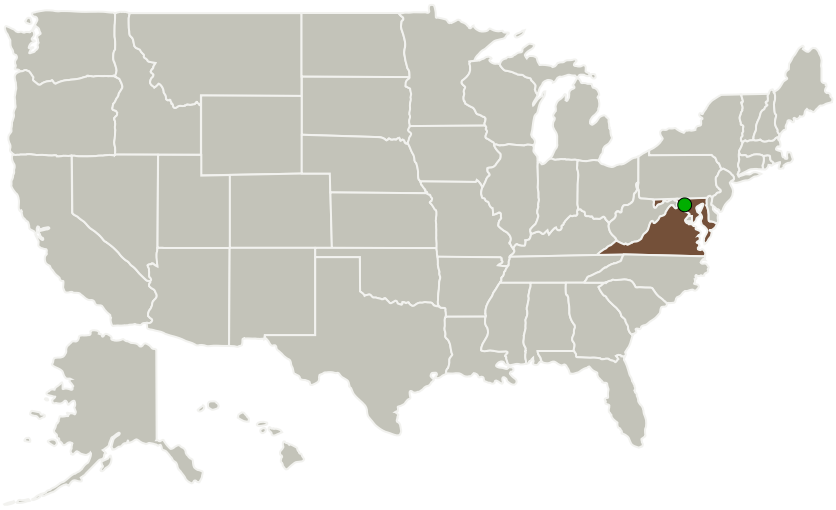
640 GHz Heterodyne Polarimeter, Phase I

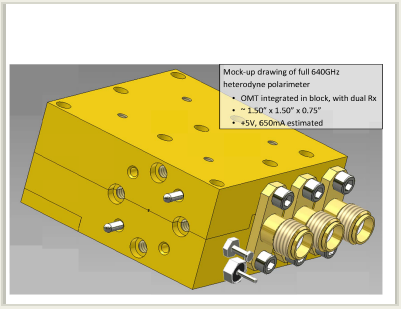
Completed Technology Project (2016 - 2016)

Project Introduction

This proposal is responsive to NASA SBIR Subtopic S1.02: Microwave Technologies for Remote Sensing, specifically the interest in the development of a 640 GHz Heterodyne Polarimeter with I, Q, U Channels. Suitably compact, light-weight and power efficient heterodyne instruments are required to enable polarimetric measurements for microphysical parameterization of ice clouds applicable to NASA's planned Aerosol, Cloud and Ecosystems (ACE) mission. VDI will develop and demonstrate a compact heterodyne receiver technology that achieves the polarimetric capability required for ACE and other atmospheric remote sensing instruments throughout the frequency range from 100 GHz to about 1 THz. Through the Phase 1 effort, VDI will demonstrate the feasibility of achieving the 640 GHz polarimetric receiver capability required by NASA. This effort will include the development and characterization of a 640 GHz orthomode transducer (OMT), the demonstration of a 640 GHz low-noise amplifier, and the assembly and testing of a complete polarimetric receiver. Although the Phase 1 prototype will use discrete components (OMT, LNA, mixer, and multipliers); all of these components will be designed for full integration in Phase 2.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Virginia Diodes, Inc.	Lead Organization	Industry	Charlottesville, Virginia
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

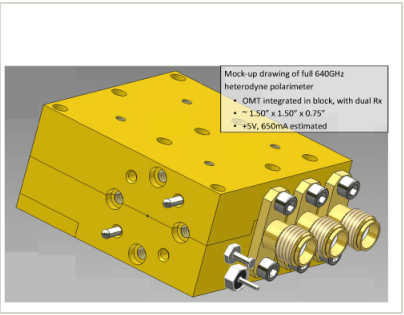
June 2016: Project Start

December 2016: Closed out

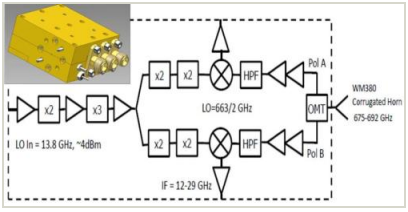
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139666)*

Images



Briefing Chart Image
640 GHz Heterodyne Polarimeter, Phase I
(https://techport.nasa.gov/image/128520)



Final Summary Chart Image
640 GHz Heterodyne Polarimeter, Phase I Project Image
(https://techport.nasa.gov/image/127896)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Virginia Diodes, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jeffrey L Hesler

Co-Investigator:
Jeffrey Hesler

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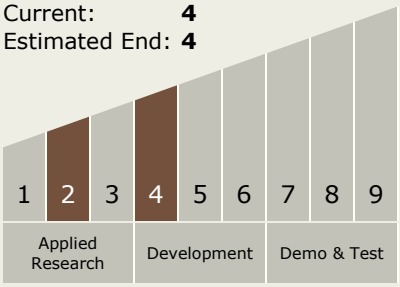
Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System